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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/814,782

04/01/2004

Yoshiaki Sakagami

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4968

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7590

11/12/2008

SQUIRE, SANDERS & DEMPSEY L.L.P.

8000 TOWERS CRESCENT DRIVE

14TH FLOOR

VIENNA, VA 22182-6212

EXAMINER

OLSEN, LIN B

ART UNIT

PAPER NUMBER

3661

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/814,782	Applicant(s) SAKAGAMI ET AL.	
	Examiner LIN B. OLSEN	Art Unit 3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed July 7, 2008 have been fully considered but they are not persuasive. On page 11 of the applicant's reply, applicants point to page 30, lines 12-26 of the specification as illustrating the robot's speech prompting the subject to keep the distance from said movable robot to the subject at the predetermined distance, and said prompting operation comprises informing the subject whether it needs to change its movement pace based on at least one of an increase or a decrease in the actual distance, determined based on the predetermined distance between the movable robot and the subject. As detailed below, in the 35 USC 112 1st paragraph rejection the Examiner does not agree that the illustration of the robot uttering "please wait" supports these limitations.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 10 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims include the recitation "wherein

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the sound or the voice from the means for controlling the outputting of a sound informs the subject about a situation regarding the distance to the subject so as to prompt the subject to keep the distance from said movable robot to the subject at the predetermined distance, and said prompting operation comprises informing the subject whether it needs to change its movement pace based on at least one of an increase or a decrease in the actual distance, determined based on the predetermined distance between the movable robot and the subject.” The portion of this clause “so as to prompt the subject to keep the distance from said movable robot to the subject at the predetermined distance, and said prompting operation comprises informing the subject whether it needs to change its movement pace based on at least one of an increase or a decrease in the actual distance, determined based on the predetermined distance between the movable robot and the subject” was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The robot vocalizing to the person to be followed up is described in paragraphs 8, 10, 24, 26, 30, 32, 33, 34, 36, 52, 85, 86, 87, 91, 92, 106, and 128 of the specification. Typically the sounds are to notify the situation regarding distance to the person to be followed up. They do not prompt the subject to keep the distance from the movable robot to the predetermined distance. The closest to this is the description in paragraphs 85 and 128 where the robot requests that the subject wait, but this is not designed to cause the subject to do other than slow down so that the robot can maintain the predetermined distance.

Claims **1-2 and 5-8** rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,556,892 to Kuroki et al. (Kuroki) in view of "Vision Based Tracking with a Mobile Robot, Christian Schlegel, Jorg Illmann, Heiko Jaberg, Matthias Schuster, Robert Worz, 1998, (Schlegel) and further in view of "BIRON, let me show you something": Evaluating the interaction with a Robot Companion" Shuyin Li et al, 2004 IEEE International Conference on Systems, Man and Cybernetics, Pgs 2927 – 2834 (Li).

Regarding amended independent **claim 1**, "An apparatus for controlling a movable robot comprising a camera, moving means, and a device for outputting a sound, which comprises: – reads on Kuroki Fig 4, where a movable robot, having a picture input device (251), left and right legs, (331R and 331L) and a speech output device (253) is shown – Fig. 4 is described at col. 6, line 3 to col. 7 line 36.

"means for recognizing a subject to be followed up, which recognizes the subject on the basis of an image taken by the camera;" - reads on the authentication processor (114) of Kuroki Fig. 5, described at Col. 8 lines 44-56 which uses previously stored face images, and images of other body parts to authenticate (recognize) a valid user of the system. Even if Kuroki's authentication processor was insufficient for recognizing a subject to be followed up, Schlegel on page 420, paragraph 3.1.1 states that at startup, the person to be followed introduces itself to the robot. It would have been obvious to one of ordinary skill in the art at the time of the invention to augment the prior art

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method of Kuroki with the Schlegel's introduction to yield a positive identification of the subject to be followed.

“means for recognizing a distance to from the subject having been recognized by the means for recognizing a subject to be followed up;” – Kuroki does not measure the distance to the subject to be followed up, but Schlegel, which uses dual cameras instead of the single camera of Kuroki, determines the distance between the robot and the person using the disparity between the two simultaneous images as detailed on page 425, 1st full paragraph. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the known technique of using dual cameras to improve Kuroki's robot by allowing it to measure distance to viewed objects.

“means for controlling movement, which controls said moving means so as to keep the distance from said movable robot to the subject, having been recognized by said means for recognizing a distance to the subject, at a predetermined distance; and “ - Kuroki does not follow the identified subject, but Schlegel follows the identified subject since it is a follower robot. Further, Schlegel maintains a distance between the robot and the person as mentioned on page 425, line 5-8. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Schlegel's known technique of following to the subject previously identified by Kuroki at a distance in order to have Kuroki's robot be more human-like.

“means for controlling the outputting of a sound, which outputs a sound or a voice related to the distance to the subject” – Reads on Kuroki's speech synthesis unit Fig. 5 120 as described at col. 9, lines 16-22. While Kuroki does not detail the robot

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discussing the distance to the person, in col. 9, lines 9-12 it describes a dialog management unit 124 that generates a reply to a user input via a speech synthesis unit 120 and subsequently outputs the reply via a loudspeaker. Li on page 2831, in the paragraph under Figure 5 details the robot informing the person being followed if they are moving too quickly. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the message of the Li robot with the capabilities of the Kuroki/Schlegel robot combination to output a speech indicating the speed discrepancy when the distance between the robot and the person became too large.

“wherein the sound or the voice from the means for controlling the outputting of a sound informs the subject about a situation regarding the distance to the subject, so as to prompt the subject to keep the distance from said movable robot to the subject at the predetermined distance and said prompting operation comprises informing the subject whether it needs to change its movement pace based on at least one of an increase or a decrease in the actual distance, determined based on the predetermined distance between the movable robot and the subject.” Schlegel and Li report that their robots were able to track and follow persons robustly in real time, with the Li robot informing the person when they were moving too fast. However, the capabilities in the Kuroki robot would have been able cause a Kuroki/Schlegel/Li robot to say words to inform requesting that the subject keep pace with the robot if needed.

Regarding **claim 2**, which is dependent on Claim 1, “wherein said moving means of the movable robot moves by two legs' walking.” – Reads on Kuroki's Legs (101R and 101L) of Fig. 1 as described in col. 43-53.

Regarding **claim 5**, which is dependent on Claim 1, “wherein the subject to be followed up is a person, and which further comprises means for judging instruction from a person.” - – reads on Kuroki col. 7, lines 47-52 for person recognition and col. 8, lines 24-34 for interpreting spoken commands such as “run”, and “hurry”.

Regarding **claim 6**, which is dependent on Claim 5, “wherein said means for judging instruction from a person judges whether or not the robot follows up the person based on the results of recognition in which the person is recognized from the face image.” – Reads on Kuroki col. 7, lines 47-52 for person authentication. Further reads on Schlegel where in paragraph 3.1.1 the person introduces itself and is recognized from the face and clothes being worn and Li at page 2831, first paragraph in “Interaction Capabilities” where the subject starts the interaction. This is helpful as when the person is being followed, they are no longer facing the robot. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the authentication type of recognition of Kuroki and the situational identification of Schlegel to yield a more robust recognition.

Regarding **claim 7**, which is dependent on Claim 6, “wherein said means for judging instruction from a person judges the instruction from the person based on at least one of posture, and gesture of said person.” – Reads on Kuroki col. 8, lines 52-54 for interpreting hand gestures.

Regarding **claim 8**, which is dependent on Claim 5, “wherein said means for judging instruction from a person judges the instruction from the person based on a voice vocalized from said person.” – reads on Kuroki col. 8, lines 24-34.

Claims **3-4** are rejected under 35 U.S.C. 103(a) as being obvious over Kuroki/Schlegel/Li and further in view of U.S. Patent Publication No. 2004/0230340 to Fukuchi et al. (Fukuchi).

Regarding **claim 3**, which is dependent on Claim 1, “which further comprises means for holding map information, which holds map information of an area within which said movable robot moves, and” - While the robots of both Kuroki and Schlegel incorporate memory which could hold maps, maps are not mentioned. However, Fukuchi uses part of the memory to hold map information map of the local environment of the area – Fig. 5 and ¶19. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the map holding mechanism of Fukuchi into the robot described by the combination of Kuroki, Schlegel and Li to enhance the abstract input data on which Kuroki models a behavior.

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“wherein said means for controlling movement determines the actuation of said moving means based on the map information held in said means for holding map information.” - – While Kuroki, Schlegel and Li are silent on maps, Fukuchi enhances its maps, determining landmarks, obstacles and safety zones. Fukuchi then uses these map features to guide movement - ¶19. Once the map was incorporated in the robot of Kuroki and Schlegel, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the data so contained.

Regarding **claim 4**, which is dependent on Claim 3, “wherein a restricted area which prohibits approach is set in said map information held in said means for holding map information.” Fukuchi describes recognizing mobility regions in its map -¶¶67 – and conversely does not enter regions that are not mobile areas – such as obstacles, landmarks and safety areas - ¶¶81. It would have been obvious to one of ordinary skill in the art at the time of the invention to use these features of Fukuchi with the combined robot to better interact with the human environment.

Claim **9** is rejected under 35 U.S.C. 103(a) as being obvious over Kuroki/Schlegel/Li and further in view of UK Patent Application No. GB 2 258 098 to Na (Na).

Regarding **claim 9**, which is dependent on Claim 1, “wherein said means for controlling the outputting of a sound changes a volume of voice outputted to said device for outputting a sound, based on a circumferential noise level.” – None of Kuroki,

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Schlegel or Li mentions changing the sound based on the ambient noise. However, Na teaches automatically controlling the volume of sound based on background noise.

(Page 1, lines 6-9). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the volume control feature of Na in the moving robot described by the combination of Kuroki/Schlegel/Li to assure that the robot can be heard.

Claims **10-11** are rejected under 35 U.S.C. 103(a) as being obvious over Kuroki in view of Schlegel and Li and further in view of Japanese Patent No. JP-2005202078 A to Shimomura (Shimomura). Claims 10 and 11 are to a process for using the apparatus of claim 1 and to a computer readable medium containing a program to execute the process of claim 10. They will be treated together.

Regarding amended independent **claims 10 and 11**, "A process for controlling a movable robot comprising a camera, moving means, and a device for outputting a sound, which comprises:" - reads on Kuroki Fig 4, where a movable robot, having a picture input device (251), left and right legs, (331R and 331L) and a speech output device (253) is controlled - Fig. 4 is described at col. 6, line 3 to col. 7 line 36.

"a step for recognizing a subject to be followed up, which recognizes the subject on the basis of an image taken by the camera;" - reads on the authentication processor (114) of Kuroki Fig. 5, described at Col. 8 lines 44-56 which uses previously stored face images, and images of other body parts to authenticate (recognize) a valid user of the system. Even if Kuroki's authentication processor was insufficient for recognizing a

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subject to be followed up, Schlegel on page 420, paragraph 3.1.1 states that at startup, the person to be followed introduces itself to the robot. It would have been obvious to one of ordinary skill in the art at the time of the invention to augment the prior art method of Kuroki with the Schlegel's introduction to yield a positive identification of the subject to be followed.

“a step for recognizing a distance to the subject having been recognized by the step for recognizing a subject to be followed up;” — Kuroki does not measure the distance to the subject to be followed up, but Schlegel, which uses dual cameras instead of the single camera of Kuroki, determines the distance between the robot and the person using the disparity between the two simultaneous images as detailed on page 425, 1st full paragraph. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the known technique of using dual cameras to improve Kuroki's robot by allowing it to measure distance to viewed objects.

“a step for controlling movement, which controls said moving means so as to keep the distance to the subject having been recognized by said step for recognizing a distance to the subject at a predetermined distance; and”- Kuroki does not follow the identified subject, but Schlegel follows the identified subject since it is a follower robot. Further, Schlegel maintains a distance between the robot and the person as mentioned on page 425, line 5-8. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Schlegel's known technique of following to the subject previously identified by Kuroki at a distance in order to have Kuroki's robot be more human-like.

“a step for controlling the outputting of a sound, which outputs a sound or a voice related to the distance to the subject, “ - – Reads on Kuroki’s speech synthesis unit Fig. 5 120 as described at col. 9, lines 16-22. While Kuroki does not detail the robot discussing the distance to the person, in col. 9, lines 9-12 it describes a dialog management unit 124 that generates a reply to a user input via a speech synthesis unit 120 and subsequently outputs the reply via a loudspeaker. Li on page 2831, in the paragraph under Figure 5 details the robot informing the person being followed if they are moving too quickly. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the message of the Li robot with the capabilities of the Kuroki/Schlegel robot combination to output a speech indicating the speed discrepancy when the distance between the robot and the person became too large.

Further while none of Kuroki Schlegel or Li mention changing the sound based on distance to the subject, Shimomura teaches changing the speech form, such as sound volume, speed and intonation based on the distance detected between the robot and the user – see Derwent 2005-53276 Basic Abstract. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the volume control feature of Shimomura in the moving robot described by the combination of Kuroki/Schlegel/Li to further increase the human-like aspect of the robot.

“wherein the sound or the voice from the step for controlling the outputting of a sound informs the subject about a situation regarding the distance to the subject, so as to prompt the subject to keep the distance from said movable robot to the subject at the predetermined distance and said prompting operation comprises informing the subject

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whether it needs to change its movement pace based on at least one of an increase or a decrease in the actual distance, determined based on the predetermined distance between the movable robot and the subject.” - Schlegel and Li report that their robots were able to track and follow persons robustly in real time with the Li robot informing the person when they were moving too fast. However, the capabilities in the Kuroki robot would have been able cause a Kuroki/Schlegel/Li robot to utter words to inform the subject that the subject should keep pace with the robot if needed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIN B. OLSEN whose telephone number is (571)272-9754. The examiner can normally be reached on Mon - Fri, 8:30 -5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lin B Olsen/
Examiner, Art Unit 3661

/Thomas G. Black/
Supervisory Patent Examiner, Art Unit 3661